



7428 Rockville Road | Indianapolis, IN 46214 | 317.347.1111 office | 317.347.9326 fax

September 10, 2018

Ms. Carolyn Bury  
 Project Manager  
 Corrective Action Section 2  
 Remediation and Re-use Branch  
 U.S. Environmental Protection Agency, Region 5  
 77 West Jackson Boulevard  
 Chicago, IL 60604-3590

**Re: Sewer Gas Vapor Intrusion Investigation Work Plan  
 Franklin Power Products, Inc./Amphenol Corporation  
 Administrative Order on Consent, Docket # R8H-5-99-002  
 EPA ID # IND 044 587 848  
 980 Hurricane Road  
 Franklin, Indiana 46131**

Dear Ms. Bury:

In accordance with the United States Environmental Protection Agency (USEPA) letter dated August 30, 2018, Industrial Waste Management Consulting Group, LLC (IWM Consulting), on behalf of the “Performing Respondent”, Amphenol Corporation (Amphenol), is submitting this Sewer Gas Vapor Intrusion Investigation Work Plan (Work Plan). The Work Plan outlines the proposed work activities relating to investigating the sewer corridors located in the public right-of-ways (ROWs) within the Study Area. The Study Area includes portions of streets that are near and downgradient of the Former Amphenol facility located at 980 Hurricane Road, Franklin, IN (Site), including Hurricane Road, Upper Shelbyville Road, Hamilton Avenue, Forsythe Street, Glendale Drive, and Ross Court. The objectives of the proposed work activities are as follows:

- Determine, through sampling and analysis of sewer gas samples, if any offsite sewers are acting as preferential pathways for the transport of vapor phase volatile organic compounds (VOCs);
- Determine the lateral extent of vapor phase VOCs within the sewer corridors, if present; and
- Determine whether or not additional Vapor Intrusion (VI) investigation activities are warranted with respect to further defining the extent of vapor phase VOCs within the sewer lines or within residential homes connected to any sewer mains that have the presence of VOCs in excess of the corresponding USEPA Residential Indoor Air Screening Levels.

Although it is understood that the USEPA has requested additional work as part of the August 30, 2018 letter, additional sampling activities are not being proposed as part of this Work Plan. Those activities will be discussed in future Work Plan(s) submitted to the USEPA. However, as discussed recently with the USEPA and with your concurrence, IWM Consulting and Amphenol would like to complete the proposed work activities as quickly as possible in order to expeditiously evaluate this potential vapor intrusion preferential pathway. Consequently, this Work Plan is being submitted independently from the other Work Plans.

This Work Plan outlines the proposed methodology and sewer gas vapor sampling activities that will occur in order to evaluate the potential VI exposure pathway associated with the historical release documented to have occurred at the Site. A map displaying the Study Area is provided as **Figure 1**, which also displays the location of the Site and properties in close proximity to the Site. **Figure 2** through **Figure 7** display the sewer corridors

within the investigation area which will be sampled as part of the proposed work activities. A copy of the August 30, 2018 USEPA letter is provided as **Attachment A**.

The sanitary sewer manhole identification numbers were obtained from the City of Franklin Department of Public Works. However, the storm sewer manholes do not have identification numbers so those locations were assigned an identification from IWM Consulting.

### **Proposed Sampling Activities, Procedures, and Laboratory Analytical Methods**

IWM Consulting proposes to obtain up to twenty-eight (28) individual grab sewer gas vapor samples (plus 2 duplicates) from sanitary (maximum 24 locations) and storm (maximum 4 locations) sewer manholes located within the public ROWs in the Study Area. Given the close proximity of the two (2) sanitary sewer manholes (Manhole #250110 & #250120) east of the Site, along Hurricane Road, only one (1) of those manholes (Manhole #250120) will be sampled. Each sewer manhole will be evaluated for accessibility and manhole type (i.e. closed manhole or open grate manhole) prior to sampling. If the sewer manhole is found to be inaccessible or, in the case of storm sewer manholes, is an open grate, a sewer gas sample will not be obtained from that particular manhole(s). The reason sewer gas vapor samples are not being obtained from open grate storm sewer manholes is because open grate storm sewer manholes readily vent directly to the atmosphere and a high mixing rate of sewer gas and ambient air occur in these locations. Therefore, sewer gas vapor samples from these locations would not be as representative as samples obtained from sealed manholes.

When evaluating the type and accessibility of the manholes within the Study Area, IWM Consulting personnel will also try to obtain the depth of the sewer line (including invert) and depth to any fluid within the sewer line. This information will allow for a proper length of sample tubing to be attached to each sampling canister during the future sewer gas sampling event. Since the measurements will require the manholes to be fully removed during the inspection, IWM Consulting will complete these activities approximately 24-hours prior to the sampling event in order to minimize the amount of ambient air being introduced into the sewer manhole prior to initiating the sampling activities.

IWM Consulting will obtain all of the grab sewer gas vapor samples in individually certified clean, laboratory provided stainless steel 1-liter summa canisters. All of the summa canisters will be equipped with 10-minute flow regulators (~100 milliliters per minute (mL/minute) flow rate) and the samples will be obtained over an approximate 10-minute period of time. Per the verbal request of the USEPA, IWM Consulting will also obtain one (1) paired sewer gas sample from the southwestern most sanitary sewer manhole (Manhole ID #250055) located on Site, with the sampling period being over an 8-hour period of time as opposed to 10 minutes. This is the last sanitary sewer manhole before the sewer line exits the Site and corresponds to the manhole where the original sanitary sewer line historically discharged. Although the original sanitary sewer line was cut and capped, the manhole still remains and should be accessible. If for some reason this manhole is not accessible, IWM Consulting proposes to utilize the on Site sanitary sewer manhole (Manhole ID #250056) located immediately east of this location. A copy of all of the applicable Standard Operating Procedures (SOPs) which will be followed by IWM Consulting during the sewer gas vapor sampling activities is provided as **Attachment B**.

All of the samples will be labeled in the field utilizing the sample tags attached to the summa canisters by the laboratory. Information included on the sample labels includes the sample ID, sample date, sample time, and the requested analysis. A site-specific chain-of-custody (COC) will also be completed and includes all of the pertinent sampling information (i.e. sample ID, sample date, sample start and end time, initial and final field

pressure readings, summa canister ID, flow controller ID, field PID readings (if applicable), and the requested analysis).

All of the samples collected will be submitted under chain-of-custody control to Pace Analytical Services, LLC (Pace) located in Minneapolis, Minnesota for laboratory analysis of shortlist VOCs using analytical method TO-15. The shortlist VOCs include the following compounds: vinyl chloride (VC), trans 1,2-dichloroethene (trans-1,2 DCE), 1,1-dichloroethane (1,1-DCA), cis 1,2 dichloroethene (cis 1,2-DCE), 1,2 dichloroethane (1,2 DCA), methylene chloride, 1,1,1-trichloroethane (1,1,1 TCA), trichloroethylene (TCE), and tetrachloroethylene (PCE). The samples will be analyzed using a combination of EPA Method TO-15 and EPA Method TO-15 SIM. Specifically, EPA Method TO-15 SIM will be utilized when analyzing for VC, 1,2-DCA, and TCE in order to meet the most stringent USEPA Regional Screening Levels. An expedited turnaround time will be requested from the laboratory and the results of the sampling event are anticipated to be received within 2-3 working days from the date the samples are collected in the field.

For Quality Assurance/Quality Control (QA/QC) purposes, one (1) field duplicate sample will be collected at a rate of one (1) sample per every twenty (20) confirmatory samples and will be analyzed for the same analytical parameters. All of the summa canisters will also be individually certified clean by the laboratory using a combination of EPA Method TO-15 and TO-15 SIM. The duplicate sample will be attached to the parent sample with a brass tee fitting (ensuring only one common air intake) and Nylaflow or tygon tubing. Both the parent sample and duplicate sample will have their own individual flow regulator set for the sampling period but the start and end time for these samples will be the same.

Pertinent information such as laboratory certifications, a table summarizing the corresponding method detection and reporting limits for Pace, and a copy of the Pace COC which will be utilized during the work activities were previously submitted to the USEPA as part of the Ambient Air Investigation Work Plan submitted on July 25, 2018 and are not being resubmitted as part of this Work Plan.

### **Reporting**

Preliminary results (copy of the laboratory report) will be supplied to representatives from the USEPA as soon as possible once the information has been received and reviewed. A brief letter report will also be generated and submitted to the USEPA within approximately 3-4 weeks of receiving the analytical results. The sewer gas vapor analytical results will be compared to the USEPA Regional Screening Level for Residential Ambient Air using both the carcinogenic target cancer risk of 10E-06 and the non-carcinogenic hazard quotient of 1. The results will also be evaluated in accordance with the Indiana Department of Environmental Management (IDEM) Vapor Remedy Selection and Implementation Guidance Document dated February 2014. The analytical results will be validated by a third party and the validation will be included within the letter report being submitted to the USEPA. The letter report will summarize the sampling activities, results, and make recommendations regarding the need for additional sampling or investigation activities. A copy of the applicable USEPA Regional Screening Levels (shortened to be Site specific) and a copy of the IDEM Vapor Remedy Selection Guidance Document were previously submitted to the USEPA by IWM Consulting in the Residential Vapor Intrusion Work Plan dated August 27, 2018 (conditionally approved the USEPA on August 30, 2018) and are not being resubmitted as part of this Work Plan.

### **Contingency Plan/Future Work Activities**

If the sewer gas vapor sampling event confirms the presence of volatile VOCs in excess of the corresponding USEPA Regional Screening Level for Residential Ambient Air using the non-carcinogenic hazard quotient of



1, then IWM Consulting and Amphenol will work closely with the USEPA to quickly develop the appropriate next steps. The next steps may include obtaining additional sewer gas vapor samples from the sewer mains (if not defined), video logging the sewer mains to inspect and document the condition of the sewer mains, or obtaining sewer gas samples directly from the sewer laterals servicing the applicable residential properties. Please note that IWM Consulting also anticipates conducting a soil gas survey the week of September 17, 2018 and the soil gas survey will supplement this investigation and assist in gathering more information regarding the potential for vapor intrusion within the Study Area.

### **Estimated Timeline**

The table below is the estimated timeline associated with implementing this Work Plan.

<b>Task</b>	<b>Anticipated Estimated Completion Date</b>	<b>Comments</b>
Submittal of Work Plan	September 10, 2018	
USEPA Conditional Approval of the Work Plan	September 11, 2018	Anticipated date based upon previous communication with the USEPA
Locate and Evaluate Sewer Manholes	September 11, 2018	
Conduct Sewer Gas Vapor Sampling Activities	September 12 – 13, 2018	Weather dependent & may be delayed 1 day
Receipt of Preliminary Laboratory Analytical Results	September 18, 2018	Expedited analysis required, results anticipated to be received by close of business on September 18, 2018
Submittal of Preliminary Laboratory Results to the USEPA	September 19, 2018	
Contingency Work Plan Development	Week of September 17 & September 24, 2018	Will be completed if sampling results suggest additional sampling and/or investigation activities are necessary.
Submittal of Letter Report to the USEPA	October 18, 2018	

Sewer Gas Vapor Intrusion Investigation Work Plan

**EPA ID # IND 044 587 848**

Franklin, Indiana

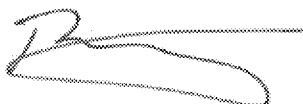
September 10, 2018

Page 5

As noted above, IWM Consulting will implement the proposed work activities as quickly as possible upon receiving USEPA approval of this Work Plan, with the expectation that that the work activities will be completed the week of September 10, 2018. Please do not hesitate to contact the undersigned with questions or if you require additional information regarding this submittal.

Sincerely,

**IWM CONSULTING GROUP, LLC**



Bradley E. Gentry, LPG #2165  
Vice President/Brownfield Coordinator



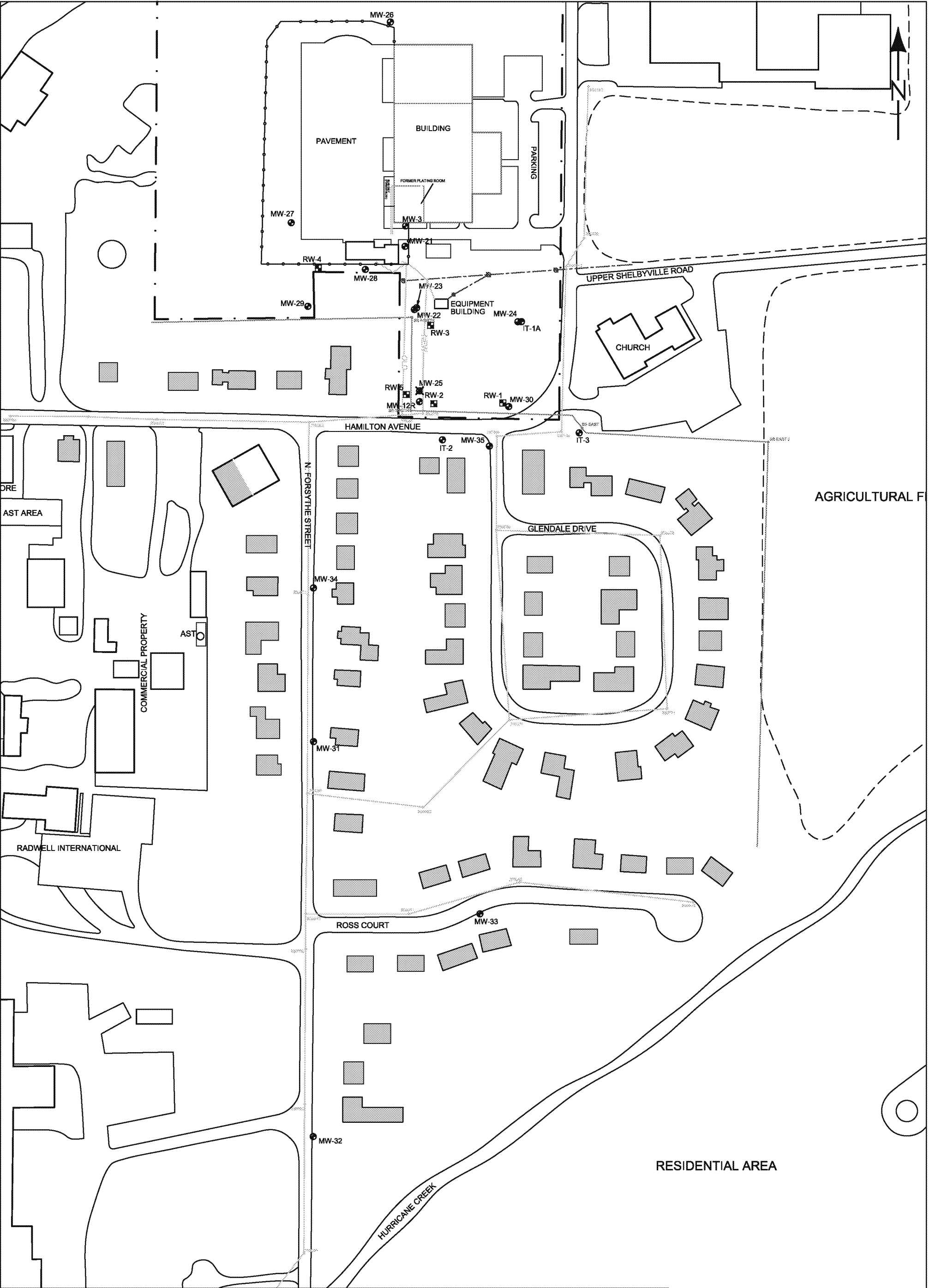
Gregory S. Scarpone, LPG #2030  
Vice President Environmental Services

cc: Joseph Bianchi, Amphenol (electronic only)  
Bhooma Sundar, U.S. EPA Region 5, RRB CAS2 (electronic only)  
Conor Neal, U.S. EPA Region 5, RRB CAS2 (electronic only)

Attachments

## Figures





LEGEND

ABANDONED MONITORING WELL

MONITORING WELL

RECOVERY WELL

SEWER MANHOLE  
(MANHOLE DEPTH IN FEET)

PROPERTY LINE (APPROXIMATE)

STORM SEWER

SANITARY SEWER

O/H POWER

RESIDENTIAL HOME  
\* DETACHED GARAGES & SHEDS NOT SHOWN

NON-RESIDENTIAL STRUCTURE

PRIMARY BUILDING WALLS

0'

150'

SCALE IN FEET

DRAWN BY: L. STRUM

DATE: 9/27/99

REVISED: 09/10/2018

HWPA #111291-01

DWG. NO. 111291S1

FIGURE 2

SITE MAP

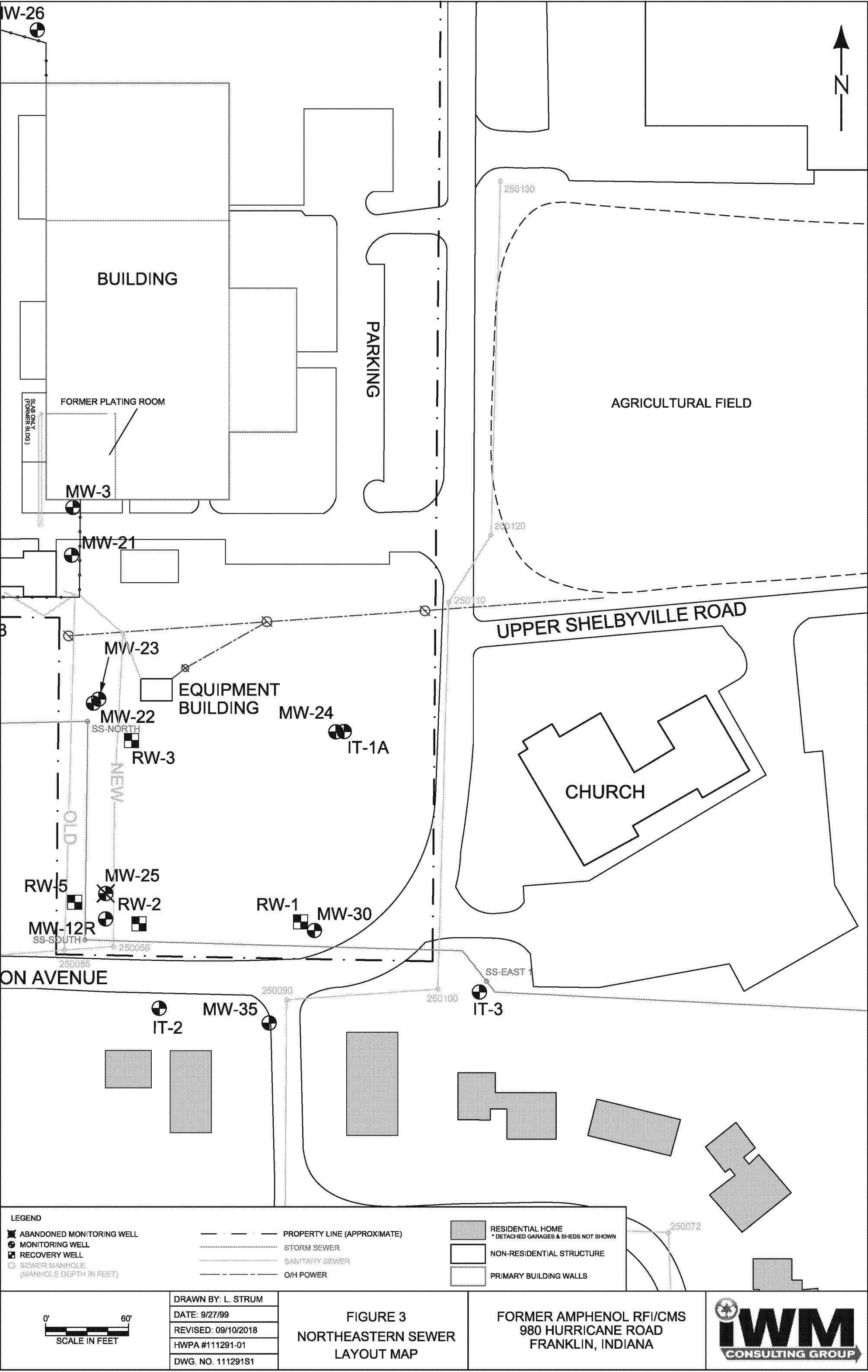
FORMER AMPHENOL RFI/CMS

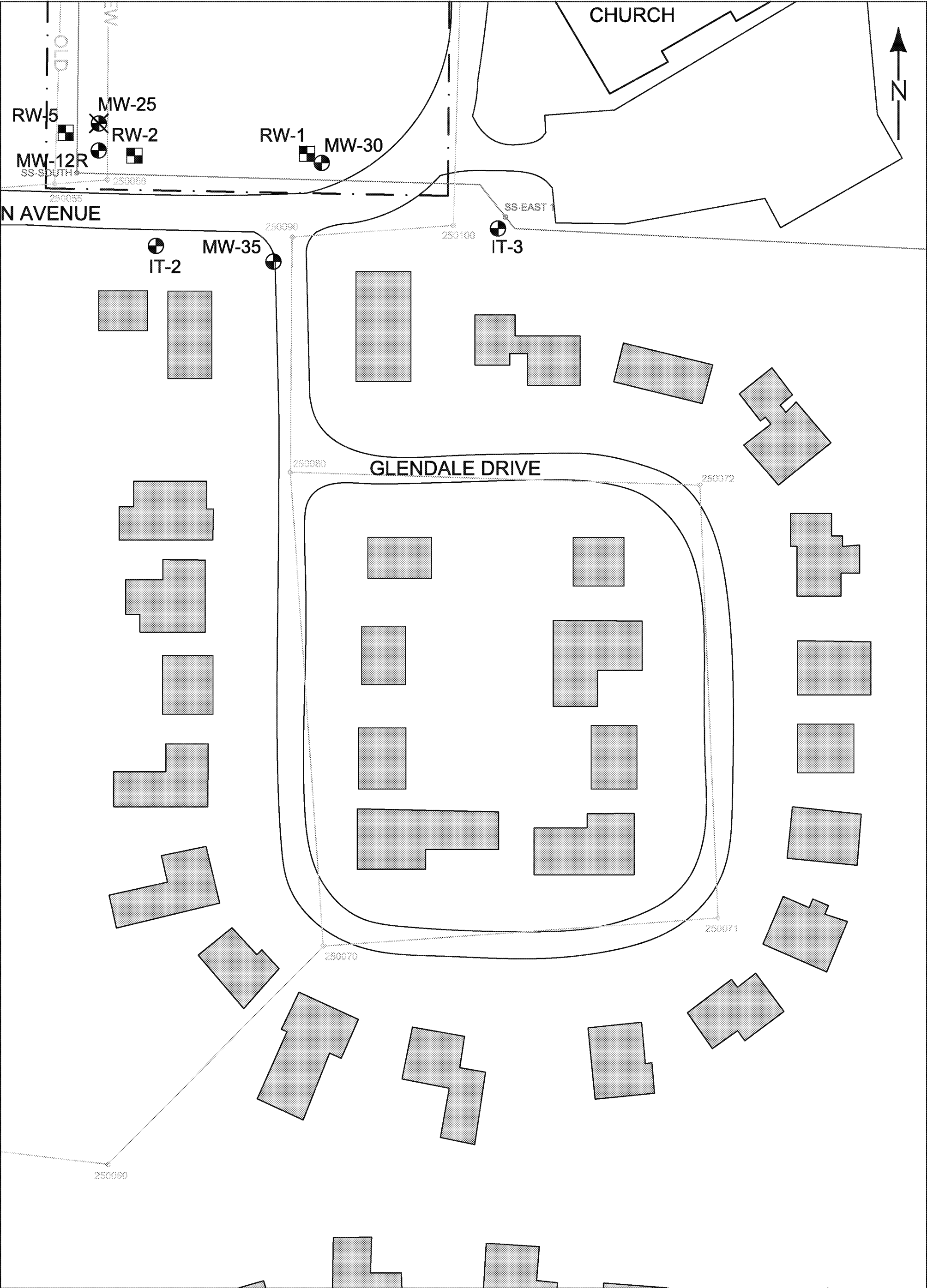
980 HURRICANE ROAD

FRANKLIN, INDIANA

IWM

CONSULTING GROUP





LEGEND

ABANDONED MONITORING WELL

MONITORING WELL

RECOVERY WELL

SEWER MANHOLE  
(MANHOLE DEPTH IN FEET)

PROPERTY LINE (APPROXIMATE)

STORM SEWER

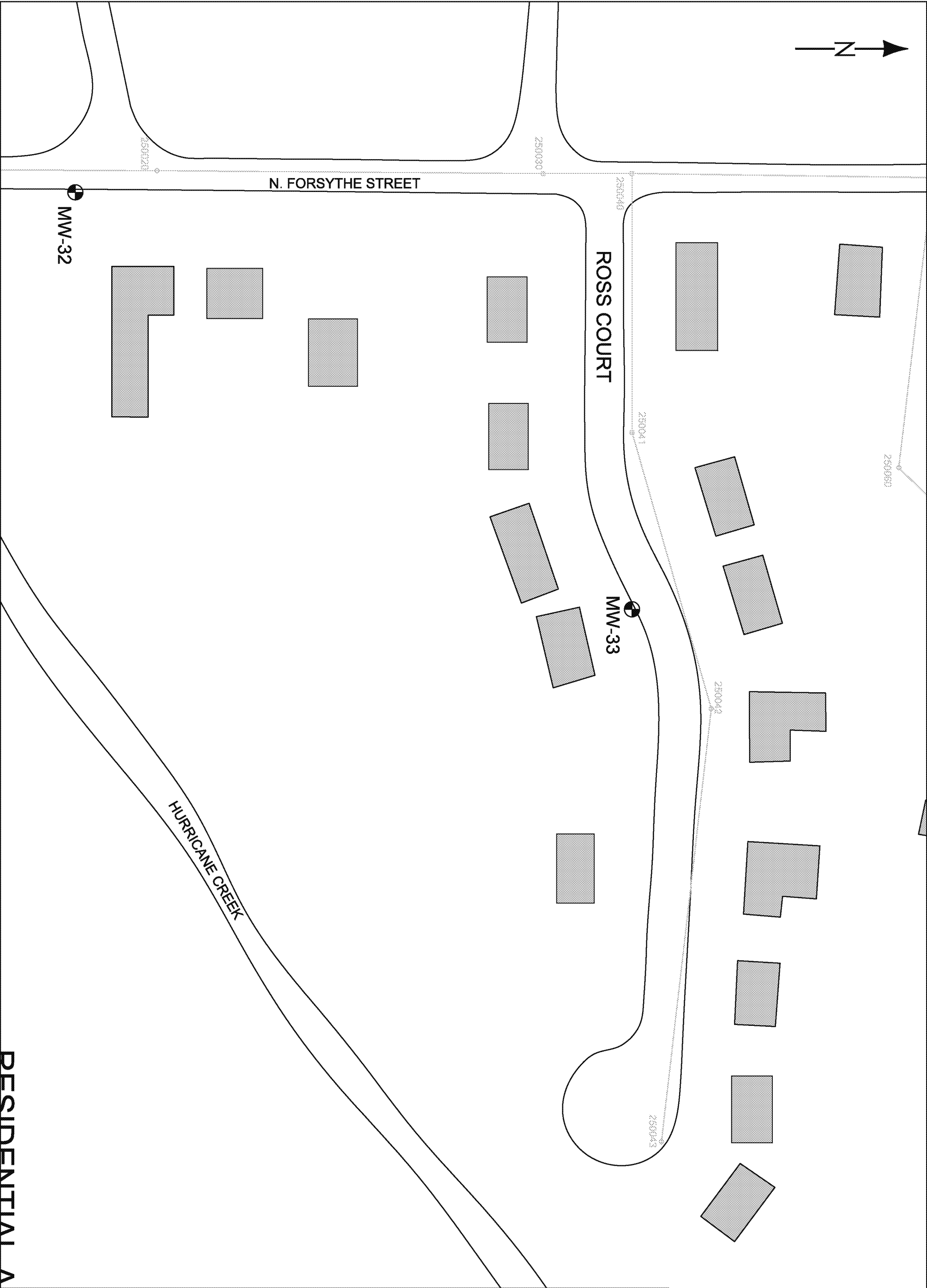
SANITARY SEWER

O/H POWER

RESIDENTIAL HOME  
\* DETACHED GARAGES & SHEDS NOT SHOWN

NON-RESIDENTIAL STRUCTURE

PRIMARY BUILDING WALLS



LEGEND

ABANDONED MONITORING WELL

MONITORING WELL

RECOVERY WELL

SEWER MANHOLE  
(MANHOLE DEPTH IN FEET)

PROPERTY LINE (APPROXIMATE)

STORM SEWER

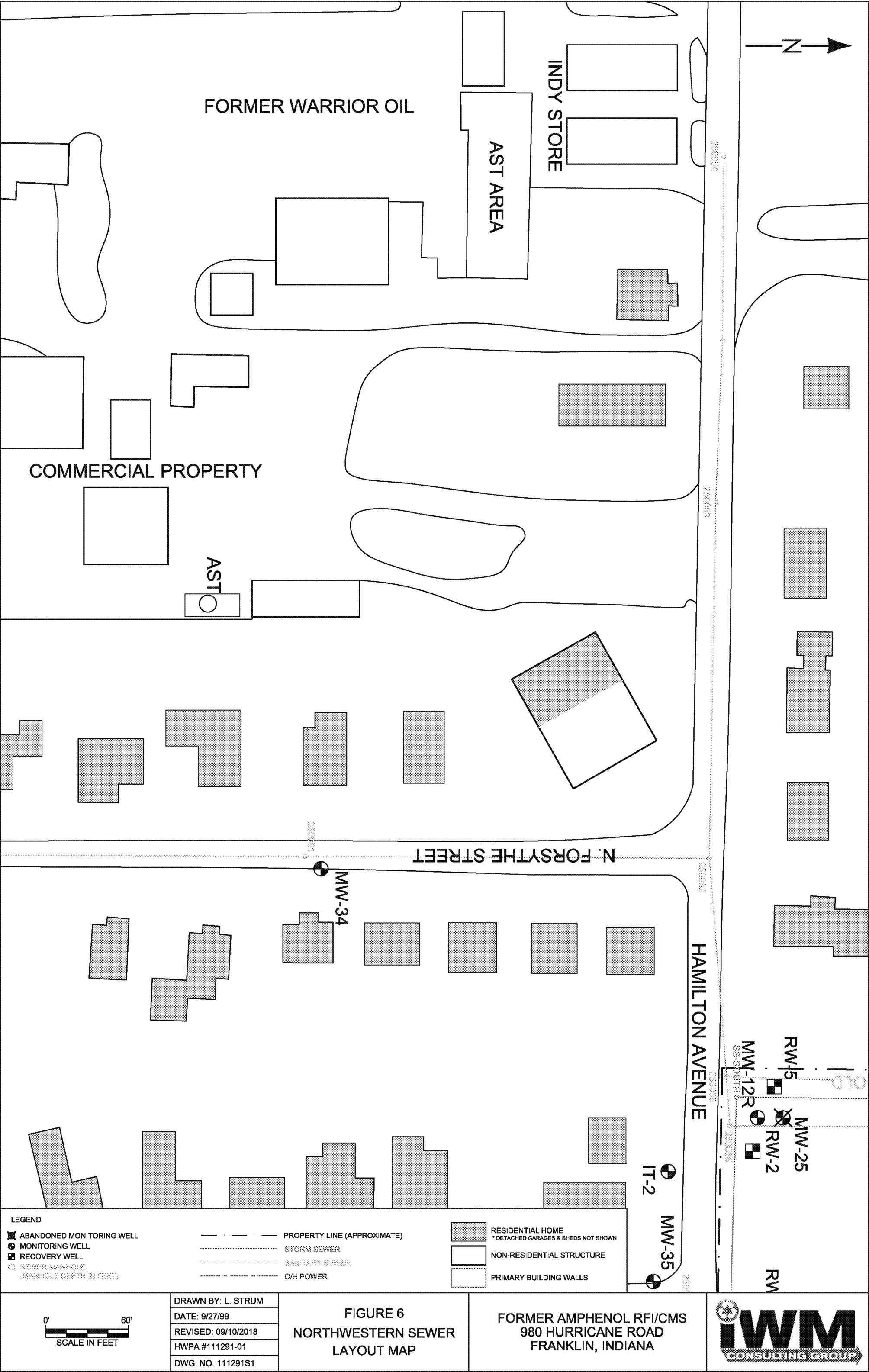
SANITARY SEWER

Q/H POWER

RESIDENTIAL HOME  
\* DETACHED GARAGES & SHEDS NOT SHOWN

NON-RESIDENTIAL STRUCTURE

PRIMARY BUILDING WALLS

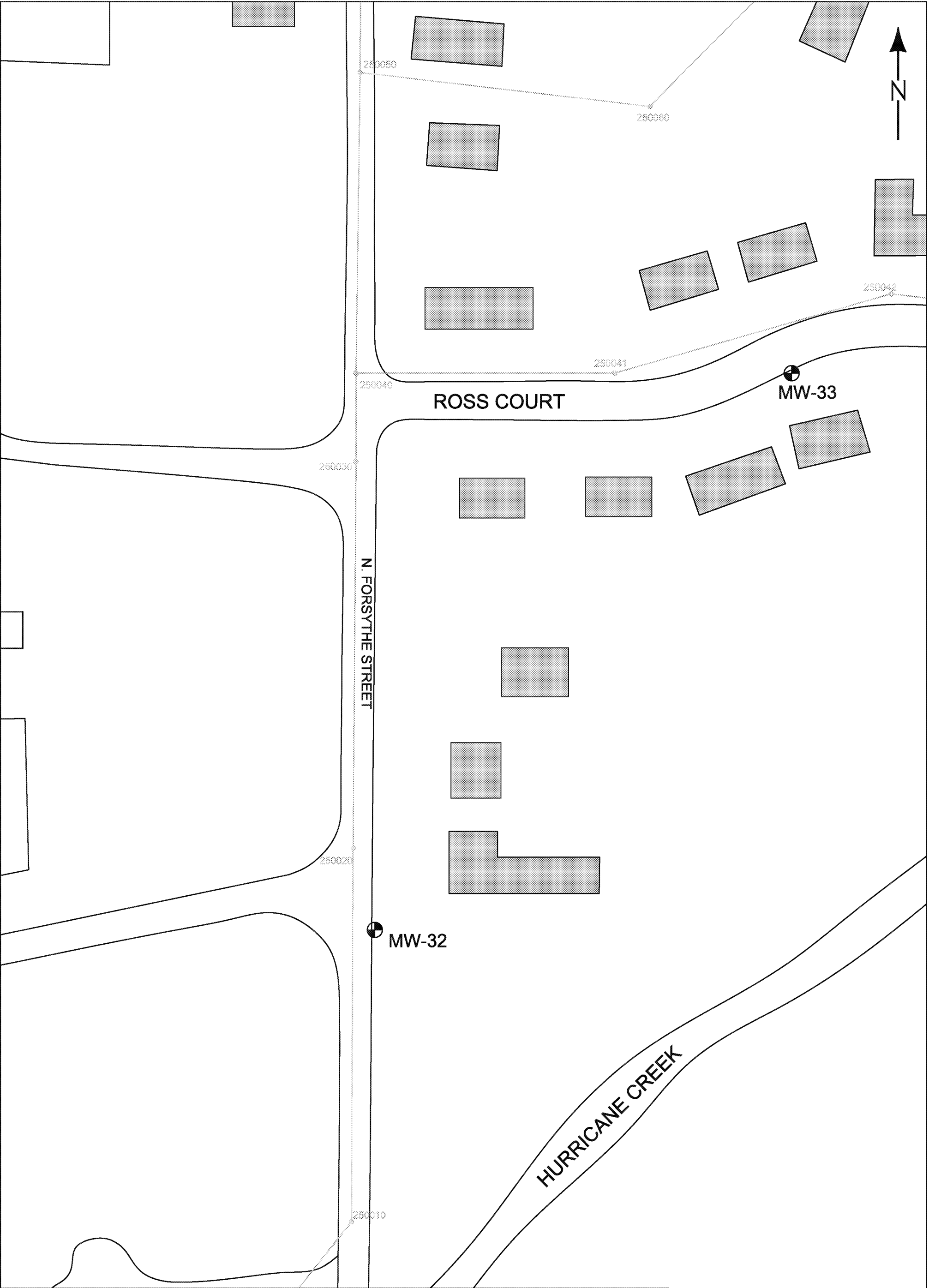


DRAWN BY: L. STRUM  
DATE: 9/27/99  
REVISED: 09/10/2018  
HWP# 111291-01  
DWG. NO. 111291S1

FIGURE 6  
NORTHWESTERN SEWER  
LAYOUT MAP

FORMER AMPHENOL RFI/CMS  
980 HURRICANE ROAD  
FRANKLIN, INDIANA





<b>LEGEND</b> ABANDONED MONITORING WELL MONITORING WELL RECOVERY WELL SEWER MANHOLE (MANHOLE DEPTH IN FEET) PROPERTY LINE (APPROXIMATE) STORM SEWER SANITARY SEWER O/H POWER RESIDENTIAL HOME * DETACHED GARAGES & SHEDS NOT SHOWN NON-RESIDENTIAL STRUCTURE PRIMARY BUILDING WALLS	
--	--

## **Attachments**



**Attachment A**

**USEPA Letter Dated August 30, 2018**





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 REGION 5  
 77 WEST JACKSON BOULEVARD  
 CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

LU-16J

Via E-mail and Certified Mail 7009 1680 0000 7671 2323  
 RETURN RECEIPT REQUESTED

August 30, 2018

Mr. Joseph M. Bianchi  
 Group EHS Manager  
 Amphenol Corporation  
 40-60 Delaware Avenue  
 Sidney, NY 13838

Mr. Matt Kupcak  
 Director, Global Environmental Programs  
 BorgWarner Inc.  
 3850 Hamlin Road  
 Auburn Hills, MI 48326

Subject: Franklin Power Products, Inc./Amphenol Corporation  
 Request for Vapor Intrusion Investigation  
 Administrative Order on Consent, Docket # R8H-5-99-002  
 EPA ID# IND 044 587 848

Dear Mr. Bianchi and Mr. Kupcak:

Under Section VIII, Paragraph N (Additional Work) of the RCRA 3008(h) Administrative Order on Consent dated November 24, 1998 (Order), EPA has determined that Respondents Amphenol Corporation and Franklin Power Products, Inc. (FPP/Amphenol), must perform Additional Work at the facility at 980 Hurricane Road in Franklin, Indiana ("Facility" or "Site"). The Additional Work described in this letter is necessary to meet the purposes of the Order, including but not limited to, assuring the selected corrective measures address the actual and potential threats to human health and the environment presented by the actual and potential releases of hazardous wastes or hazardous constituents at or from the Facility.

### Summary of Requested Work

EPA met with Amphenol Corp. on August 7 and 8, 2018 to outline the approach to the overall vapor intrusion (VI) investigation in the off-Site Study Area (see below and enclosure). to be proposed to EPA in a Work Plan. The purpose of this investigation is to evaluate the potential for vapors to enter indoor spaces through volatilization from groundwater or *via* direct entry from sewer lines. The Work Plan must propose field and

analytical approaches to measuring VOCs in environmental media, including indoor air, and propose measures to mitigate unacceptable exposures and protect human health.

As discussed during the August 7 and 8 meetings, exterior soil gas samples will be taken along rights-of-ways (ROWS) within the Study Area to expedite the investigation. Amphenol Corp. met with City of Franklin representatives to discuss an access agreement soon after the meeting with EPA and later, on August 20, 2018, Amphenol Corp. attended a City of Franklin Public Works Board Meeting and formally requested a blanket ROW access agreement for the Study Area.

By September 17, 2018, EPA requests that you submit a Vapor Intrusion Investigation Work Plan ("Work Plan") to investigate potential vapor intrusion (VI) in the Study Area. Respondents must investigate whether a complete pathway of volatile constituents is present from historical solvent releases at the Site to off-Site receptors. Primary migration pathways of concern include storm and sanitary sewers, and groundwater to soil. The Work Plan must be consistent with EPA guidance found in *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (EPA OSWER, 2015).

Respondents and EPA will coordinate closely during plan development with the objective of Work Plan execution upon approval.

### **Purpose of Sampling Event**

The primary objective of the requested investigation is to determine whether potential Study Area vapor intrusion requires mitigation measures to protect human health.

### **Study Area**

The investigation will focus on the Study Area where VOCs were historically present in groundwater, soil gas, and sewer gas downgradient of the Site at elevated levels. EPA evaluated historical environmental data provided under the Corrective Action order (circa 1990's) to guide the planning and scope of the investigation. The Study Area boundary was based on historical data and current remedial operations reports: the remedial facility investigation; corrective measures study; and (ongoing) corrective measures implementation phases of the corrective action work. Data from the VI investigation will be used to inform next steps, including a need to expand the Study Area, and to determine a need for additional remedial measures.

The Study Area includes portions of streets that are near and downgradient of the former facility: Hurricane Road, Hamilton Avenue, Forsythe Street, Glendale Drive, and Ross Court (figure provided by Amphenol Corp. enclosed).

Please provide a draft Conceptual Site Model (CSM) with the investigation report using the collected data for evaluating conditions and informing next steps. In a subsequent work plan request, EPA will require that current groundwater conditions be delineated. This work will update the CSM and inform decisions regarding a need to expand the Study Area.

## **Work Plan**

The Work Plan must describe the general approach to collecting VOC samples for evaluating potential soil vapor intrusion pathways in the Study Area and provide the field and analytical SOPs for completing the work.

Following the demonstration of a complete exposure pathway of VOCs in indoor air, determinations will be made regarding the need for mitigation in individual homes and remediation in areas of preferential pathways. To the extent practical, investigations within buildings and on individual properties should ensue with the goal of limiting return visits, which can cause disruption and inconvenience for building occupants and owners. EPA recognizes potential delays with obtaining formal access to homes/buildings and the potential need for more than one mobilization.

Soil Gas Samples To expedite the investigation, exterior soil gas samples will be taken along rights-of-ways (ROWS) within the Study Area where Amphenol Corp. has formally requested a blanket access agreement with the City of Franklin. Sample results above EPA soil gas screening levels at the ROW locations near homes initiates the requirement for concurrent collection of sub-slab and indoor air samples at adjacent homes.

Sub-Slab and Indoor Air Samples The Work Plan must identify the approach to sub-slab and indoor air sampling and include a summary of the plan to obtain access to homes.

Sewer Gas VOC Samples The Work Plan should propose sample locations and describe the rationale for continuing the VI investigation along the pathway. Include the following locations in the work plan:

- 1) manholes within the streets identified in the Study Area;
- 2) lateral sewer lines if sewer gas exceeds EPA indoor air screening levels; and,

- 3) indoor samples in bathrooms if lateral sewer samples exceed EPA indoor air screening levels.

Where sewer gas levels exceed EPA indoor air screening levels, a sewer video survey should be completed to characterize conditions that could provide a pathway for entry of soil vapors from underlying soil or groundwater (cracks and other defects).

The Work Plan should include a table showing which sample type will be compared to which screening value for each chemical on the analyte list.

### **Groundwater Samples**

As part of this investigation, you must sample groundwater any intact monitoring wells in the Study Area, and measure water levels.

### **Analyte List**

Samples will be analyzed for these Site-related constituents identified in previous investigations and sampling events conducted under the AOCs: vinyl chloride (VC), trans-1,2-dichloroethylene (trans-1,2-DCE), 1,1-dichloroethane (1,1-DCA), cis-1,2-dichloroethylene (cis-1,2-DCE), 1,2-dichloroethane (1,2-DCA), methylene chloride, 1,1,1-trichloroethane (1,1,1 TCA), trichloroethylene (TCE), and tetrachloroethylene (PCE).

### **Third-party Validation**

Analytical results must be validated by a qualified data validation that is independent of the project.

### **Quality Assurance**

The Quality Assurance (QA) Plan must be consistent with EPA's QAR-5, *EPA Requirements for Quality Assurance Project Plans* (EPA 2001) found at [https://www.epa.gov/sites/production/files/2016-06/documents/r5-final\\_0.pdf](https://www.epa.gov/sites/production/files/2016-06/documents/r5-final_0.pdf). All samples must be analyzed by a laboratory with appropriate ELAP certification, as specified in the guidance. Please also refer to *Guidance for Quality Assurance Project Plans*, EPA QA/G-5 (EPA 2002) when developing the QA/Quality Control portions of the Work Plan.

## **Response Plan**

Respondents' proposed Work Plan must include the proposed response measures for mitigating vapor entry into buildings from the soil column and terminating the potential migration of soil vapors into buildings via a sewer pathway. If the investigation results in additional VI pathways (along other utilities), then Respondents must propose corresponding remedial measures.

## **Potential On-Site Investigative Work**

During the August 7 and 8, 2018 meeting and site visit, EPA and Amphenol Corp discussed the need for and approach to indoor air sampling in the occupied buildings on the former facility property. Respondents may include the on-Site VI work in the subject Work Plan. Alternatively, that investigation could be included in the second ambient air sampling event scheduled for this fall.

## **Schedule**

The proposed Work Plan must include a schedule of activities from pre-work plan activities through final report submittal.

## **Next Steps - Other Corrective Action Work**

When this investigation is completed, EPA will determine whether there is a need for additional VI investigation in an expanded area. EPA will require a groundwater investigation to determine whether a plume is present downgradient of the Site and whether Site constituents of concern (COCs) impact human health and the environment.

The plume will be defined two ways:

- 1) COCs exceeding EPA Maximum Contaminant Levels (MCLs) or Vapor Intrusion Screening Levels (VISLs); and,
- 2) COCs exceeding water quality standards at Hurricane Creek.

In addition, the extent of any source materials must be determined, including DNAPL or contaminated soils contributing to a groundwater plume related to Site activities. The extent of soil contamination will be determined by:

- 1) COCs exceeding Indiana's Residential Soil Migration to Groundwater Screening Levels (MTGSLs) in unsaturated soils; and,

- 2) Saturated soils exceeding a soil screening level calculated using EPA's *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (EPA OSWER, 2002). See <https://semspub.epa.gov/work/HQ/175878.pdf>.

If you have any questions, please contact me at (312) 886-3020. Also, please feel free to contact Dr. Bhooma Sundar, EPA risk assessor, at (312) 886-1660 to assist you in Work Plan development.

Sincerely,



Carolyn Bury  
Project Manager  
Corrective Action Section 2  
Remediation and Re-use Branch

Enclosure

ecc: Brad Gentry, IWM Consulting Group, LLC.  
Don Stilz, IDEM  
Bhooma Sundar, RRB CAS2  
Conor Neal, RRB CAS2

**Attachment B**

**IWM Consulting SOP Group F  
Sewer Gas Vapor Sampling Activities**



SOP Group F  
Revision 0.0

**SOP Group F  
Standard Operating Procedures  
For Sewer Gas Vapor Sampling Activities**

**TABLE OF CONTENTS**

**Introduction..... 2**

**SOP F.1 Sewer Gas Vapor Sampling ..... 2**

**Appendix A - Air Sampling Field Data Sheet**

## SOP Group F Standard Operating Procedures For Sewer Gas Sampling Activities

### Introduction

This standard operating procedure (SOP) sets forth the criteria and guidelines used to obtain sewer gas samples for analysis of volatile organic compounds (VOCs). All sewer gas samples will be collected using summa canister sampling kits provided by the contract laboratory.

When evaluating the vapor intrusion exposure pathway, potential sampling methods and locations include sewer gas vapor sampling (SWG). When performing these sampling activities under the direction of a regulatory agency, the sampling methods and locations should be discussed and approved by the regulatory project manager prior to implementing the work activities.

In general, 1-liter stainless steel summa canisters are utilized when obtaining grab SWG samples and are typically obtained over a 5-10-minute period of time; however, site-specific sampling requirements may require alternative summa canister sizes and/or sampling times.

The Air Sampling Field Data Sheet provided in **Appendix A** should be completed when conducting the sampling activities.

### SOP F.1 Sewer Gas Vapor Sampling

SWG samples will be submitted to the contract laboratory for TO-15 laboratory analysis. **The recommended sample container is a 1-liter summa canister equipped with a flow regulator calibrated to a sampling rate of 100 mL/minute. This will equate to a total sampling time of 10 minutes.** The sampling and screening procedures shall include the following:

1. The contract laboratory will provide certified clean summa canister sampling kits which will include a 1-liter summa canister, sampling inlet line with fittings, filter, and flow regulator (set for approximately 10 minutes for 1-liter canisters). The summa canisters and flow regulators will be tagged with matching serial numbers provided by the laboratory.
2. Prior to initiating the sampling activities and utilizing the laboratory provided summa canisters, the vacuum of each summa canister and the leak integrity of the canister and regulator should be checked via the “shut-in test” by opening the valve of the summa canister while the cap is still on the sampling port of the summa canister then closing the valve. The observed vacuum on the canister vacuum gauge should exhibit no change after 1 minute. If the observed vacuum

changes, the cap, connection fittings, and/or regulator will be re-tightened, then if necessary, reseated, tightened, and retested. Additionally, the observed vacuum should be within 4-inches of mercury from the lab recorded vacuum prior to shipment from the laboratory. The laboratory will provide the user of the summa canisters the lab recorded vacuum for each canister and if there is >4-inches of mercury difference, the integrity of the summa canister is questionable, and the summa canister cannot be utilized for the sampling activities.

3. Prior to initiating the sampling activities and utilizing the appropriate sampling train, a leak test of the sampling set-up should be performed. Attach the Nyaflow tubing (or Teflon lined tubing) to the canister regulator with the provided Swagelok ferrules and attach a medium length piece of Tygon tubing to the Nyaflow tubing and to a hand-held vacuum pump with a pressure gauge and stopcock. Induce a vacuum of at least 15-inches of mercury on the sample sampling set-up with the stopcock open and then close the stopcock. The observed vacuum on the pressure gauge should exhibit no change after 1 minute. If the observed vacuum changes, tighten the Swagelok connection for the canister regulator and Nyaflow tubing and retest. If the observed vacuum does not change, the sampling set-up is tight and the Tygon tubing will be cut short for subsequent sampling. **Do not remove or adjust the remaining sampling train after the sampling train has been verified tight.**
4. Prior to initiating the sample collection phase of the sampling event, the sampling location manhole will be opened approximately 3 to 6 inches to minimize any ambient air influence. Measurements of the invert, top of sewer pipe, and top of water flowing within the sewer elevations to the rim of the manhole will also be obtained, if feasible.
5. Following the manhole measurements, Nyaflow tubing will be prepared with an attached weight or be attached to an extendable rod and lowered so that the end of the tubing is halfway between the top of the water within the sewer and the top of the sewer pipe. Approximately three (3) times the “dead volume” of air within the sampling tubing should be slowly (~100 to 200 mL/minute) purged from the tubing. **Generally, one (1) volume of air from the sampling tubing (assuming ¼-inch diameter) is approximately 5 mL per foot of tubing.** The air can be purged using an SKC Airchek sampler set at a rate of 0.1 liters per minute, an RKI GX-6000 multi-gas PID monitor (or equivalent), or from a graduated syringe. The purged air will be removed from the tubing and discharged into the atmosphere or temporarily into a 1 or 2-liter tedlar bag. The temporarily stored purged air (either from the syringe or tedlar bags) should then be released to the atmosphere once outside the structure, preferably in a downwind location from the structure. Measure and record the purge rates and volumes. Measure and record the stabilized lower explosive limit (LEL), O<sub>2</sub>, and PID readings if using the RKI GX-6000 multi-gas PID monitor. **If possible, the sewer manhole will be completely closed (or as close to it as possible) prior to sampling in order to minimize ambient air influence.**

6. Prior to sample collection the appropriate information will be completed on the Air Sampling Field Data Sheet provided in **Appendix A**. The canister will be equipped with a pre-determined time flow regulator and connected to the sampling tubing via the short piece of Tygon tubing. The summa canister and flow regulator will be opened and the pressure differential will cause the air sample to enter the canister at the pre-determined flow rate. The vacuum applied by the summa canister during the sampling events should be as low as possible. The sampling activities are complete when the vacuum on the summa canister is between approximately 3 and 5-inches of mercury or the pre-determined timeframe is reached, whichever occurs first. Care should be taken as to not allow the vacuum to reach zero.
7. Upon completion of the sampling time, shut off the flow regulator and record the appropriate information on the Air Sampling Field Data Form. Remove the sampling train from the summa canister, tightly secure the cap on the summa canister, and ship the sampling kit back to the contract laboratory following typical chain of custody protocols. Confirm that the sampling kit serial numbers all match prior to delivery to the laboratory.
8. Be certain to record the initial and final canister pressures, start and stop times for canister filling, and appropriate canister pressure checks during sampling

SOP Group F  
Revision 0.0

**Appendix A**  
**Air Sampling Field Data Sheet**

## Air Sampling Data Sheet

VI Sampling Event Date: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Project: \_\_\_\_\_

Building HVAC Status: \_\_\_\_\_

Building Site Address: \_\_\_\_\_

Sampling Personnel: \_\_\_\_\_

Sample ID	Sampling Location	Sampling Time		Vacuum (in Hg)		Canister Details	
		Start		Initial		Canister ID #	
		End		Final		Flow Controller #	

Canister Pressure Check

Time							
Vacuum (in Hg)							

Sample Type: Soil-Gas \_\_\_\_ Sub-Slab \_\_\_\_ Indoor \_\_\_\_ Ambient \_\_\_\_ Other \_\_\_\_     
 Timeframe: 24-Hr \_\_\_\_ 8-Hr \_\_\_\_ Grab \_\_\_\_     
 Canister Type: 6L Summa \_\_\_\_ 1L Summa \_\_\_\_ Other \_\_\_\_

Notes: \_\_\_\_\_     
 Sample Height / Depth (ft.): \_\_\_\_\_     
 Analytical Method: TO-15 \_\_\_\_ TO-15 SIM \_\_\_\_ Shortlist \_\_\_\_

Sample ID	Sampling Location	Sampling Time		Vacuum (in Hg)		Canister Details	
		Start		Initial		Canister ID #	
		End		Final		Flow Controller #	

Canister Pressure Check

Time							
Vacuum (in Hg)							

Sample Type: Soil-Gas \_\_\_\_ Sub-Slab \_\_\_\_ Indoor \_\_\_\_ Ambient \_\_\_\_ Other \_\_\_\_     
 Timeframe: 24-Hr \_\_\_\_ 8-Hr \_\_\_\_ Grab \_\_\_\_     
 Canister Type: 6L Summa \_\_\_\_ 1L Summa \_\_\_\_ Other \_\_\_\_

Notes: \_\_\_\_\_     
 Sample Height / Depth (ft.): \_\_\_\_\_     
 Analytical Method: TO-15 \_\_\_\_ TO-15 SIM \_\_\_\_ Shortlist \_\_\_\_

Sample ID	Sampling Location	Sampling Time		Vacuum (in Hg)		Canister Details	
		Start		Initial		Canister ID #	
		End		Final		Flow Controller #	

Canister Pressure Check

Time							
Vacuum (in Hg)							

Sample Type: Soil-Gas \_\_\_\_ Sub-Slab \_\_\_\_ Indoor \_\_\_\_ Ambient \_\_\_\_ Other \_\_\_\_     
 Timeframe: 24-Hr \_\_\_\_ 8-Hr \_\_\_\_ Grab \_\_\_\_     
 Canister Type: 6L Summa \_\_\_\_ 1L Summa \_\_\_\_ Other \_\_\_\_

Notes: \_\_\_\_\_     
 Sample Height / Depth (ft.): \_\_\_\_\_     
 Analytical Method: TO-15 \_\_\_\_ TO-15 SIM \_\_\_\_ Shortlist \_\_\_\_